Please add the following claim:

28. (New) A stream switching system, comprising:

a stream switching housing having at least one common stream channel portion with a plurality of input ports and at least one output port;

tubing connected at least one of said output ports;

insulation surrounding said stream switching housing and said tubing;

a heater to warm said stream switching housing and said tubing to a predetermined temperature;

said tubing at least in part being a pre-heat coil suitable to heat a fluid sample having a liquid portion and to act as a flow restrictor for flow restriction of said fluid sample such that said fluid sample is heated to said predetermined temperature.

29. (New) The stream switching system of claim 28, wherein said predetermined temperature is eighty degrees Fahrenheit.

30. (New) The stream switching system of claim 28, further comprising:

a gas chromatograph attached to said output port, wherein said gas chromatograph is maintained at a second predetermined temperature and said predetermined temperature for said fluid sample is the same as said second predetermined temperature.

Real Party In Interest

The real party in interest is the Assignee: Daniel Industries, Inc., a division of Emerson.

Related Appeals And Interferences

No appeals or interferences are known to the Applicants, the Applicants' legal representative, or the Assignee which will directly affect or be directly affected by or have a bearing on the Examiner's decision.

Status of Claims

Originally filed claims:	1 – 17
Cancelled claims:	18, 19, and 22
Presently pending claims:	1-17, 20-21, and 23-28

Allowed claims:	none
Rejected claims:	1-17, 20-21, and 23-27
Claims objected to:	none

Summary of Invention

The comments below apply only to those claims that specifically recite the described features. Not all of the comments below apply to every appealed claim.

The invention is directed to an improved stream switching system. The improvements include combining flow restriction tubing with a multi-input, common stream path housing (16/4)[1] the use of specialized solenoid to prevent gas and sample leaks during power failure (20/3) and special stream switching filter placement upstream of the stream switching housing (14/6).

In the field of gas chromatography, it is often necessary to sample the fluids flowing through a pipeline (1/7). Prior to the invention, those skilled in the art often employed a stream sampling system with a long distance between the sample point and the handling system (2/1). For accurate measurement, the tubing would need to be flushed, introducing a significant lag time between samples (2/5). Shortening the distance was unrealistic because the large handling system would then need to be continued in an expensive, explosion-proof housing. (2/12). In addition, prior handling systems often had a considerable amount of "dead volume" of sample inside the handling system itself, further slowing analysis since this dead volume of sample must similarly be purged between analyses.

A new sample handling system was therefore developed. For the Examiner's convenience, Figure 7 of the application is reproduced below:

[1] (16/4) refers to page 16, line 4 of the original patent.

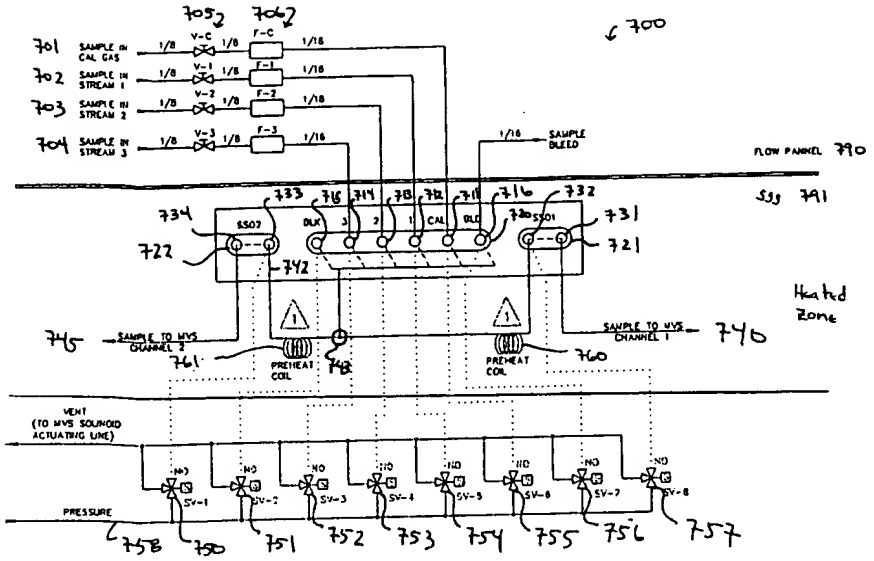

Figure 7

Referring now to Figure 7, stream switching system 700 includes a flow panel portion 790 upstream of sample wetted portion 791. Flow panel portion includes inputs for calibration 701, stream 1 702, stream 2 703, and stream 3 704. Streams 701-704 include respective valves 705 and respective particulate filters 706 along each stream's length prior to entry of the sample wetted portion of the stream switching system.

Streams 701-704 supply various fluid samples to the sample wetted portion 791, and connect respectively to actuatable calibration port 711 and actuatable stream ports 712-714. Actuatable ports 715-716 and 732-733, as well as ports 731 and 734, are also part of the sample wetted portion 791. Each actuatable port may be actuated into either an open or closed state as controlled by eight connected solenoids 750-757 (SV1 - SV8) which correspond respectively to ports 711-716, 732-733. When a port is in an open state, fluid may pass freely through the port. When a port is in a closed state, fluid is prevented from flowing through that port. Also shown in Figure 7 are solenoid pressure line 758 and solenoid vent line 759.

Figure 7 shows a "double block and double bleed" stream switching system. Each actuatable stream port 712-714, as well as actuatable calibration port 711, is positioned in an area 720 that creates a common sample path. Also positioned in the common sample path 720 are an actuatable "blocking" port 715 and an actuatable "bleed" port 716. In addition, area 721 creates a first sample shut off that contains tube "blocking" ports 732 and 731. Area 722 creates a second

sample shut off that contains two "blocking" ports 733, and port 734. As shown, ports 732 and 733 are actuatable, while ports 731 and 734 are not. It is to be understood that all of these ports could be actuatable, or ports 731 and 734 could be actuatable while ports 732 and 733 are not.

Two channels, channel 1 740 and channel 2 745, are output tubing that direct fluid sample away from the stream switching portion. Each channel thus may be separately analyzed by a gas chromatograph. Each channel can also be used as a flow path to "bleed" the system when switching from sample point to sample point.

A first flow restrictor and pre-heat coil 760 is in association with coil 1, and a second flow restrictor and preheat coil 761 is in association with coil 2. More specifically, first pre-heat coil 760 is located between "T" point 743 and the first sample shut off. Second pre-heat coil 761 is located between "T" point 743 and the second sample shut off.

First and second sample shut offs correspond to first and second channels 740, 745. Consequently each channel is associated with two solenoids 750 and 757, either one of which can be actuated to prevent the flow of any fluid through the channel. In the illustrated embodiment, the flow of fluid through channel 1 may be prevented by closing either actuatable blocking port 715 or actuatable port 732 in the first sample shut off. Similarly, the flow of fluid through channel 2 may be prevented by closing either actuatable blocking port 715 or the actuatable port 733 in the second sample shut off. Thus, because the flow of fluid may be prevented through a channel at either of two locations, this is a "double block" design. In addition, the system may be bled through sample bleed port 716. Thus, because the system may be bled either through a channel or through the sample bleed port 716 the embodiment is a "double bleed" design.

As sample flows through the respective flow restrictors and pre-heat coils 760, 761, the sample is heated. This heating of the sample, if desired, accomplishes two goals. First, the sample must preferably be introduced to the gas chromatograph as a single phase sample instead of a two-phase liquid/gas sample. Temperatures above about 80 degrees Fahrenheit are normally adequate to maintain a gaseous sample of most hydrocarbon process streams at a sample pressure of 15-25 psi. Second, an elevated temperature (preferably near the chromatograph temperature) for the sample is desirable for the optimal operation of the gas chromatograph. Thus, the "pre-heating" of the sample helps to achieve a more accurate measurement of the sample's composition by the gas chromatograph. Further, the pre-heat coil additionally acts as a restriction column to flow because of a small inner diameter. By selecting the proper diameter tubing, the sample flow at the vent is

reduced from an unobstructed 200-250 cc/minute at 15 psig inlet pressure to about 50-70 cc/min at 15 psig. The increased control over sample flow rate given by the pre-heat coil allows simultaneous analysis by gas chromatographs downstream to each coil.

Prior Proceedings

In a non-final office action dated November 5, 2001, the Examiner rejected claims 1-8 under 35 U.S.C. § 112, second paragraph as indefinite, claims 1-12, 20, 21, and 23-27 under 35 U.S.C. § 102(e) as anticipated by *Higdon*, and claims 13-17 under 35 U.S.C. § 103(a) as obvious in view of *Higdon* and *Upchurch*.

With respect to the rejection under 35 U.S.C. § 112, second paragraph an amendment to claim 1 is submitted herewith that is believed to overcome the rejection. Although the scope of claim 1 has not changed, clear antecedent basis has been provided for the term "flow restriction". Favorable reconsideration is respectfully sought.

With respect to the *Higdon* rejection of claim 1 and the claims that depend therefrom, the Examiner stated, "Note the disclosure of a '...stream switching system...' for a chromatograph including a plurality of solenoid valves 98, a sheet heater (column 4, line 57+), and an insulated hosing (Figure 3B, for example). Contrary to applicants previous remarks, the patent to *Higdon et al* clearly shows a common stream channel (single inlet/multiple outlet 72) valved by a particular solenoid 98. 'At least part of the tubing being pre-heated...' by the 'sheet heater' (column 4, lines 57+)(claims 1+). The solenoid actuated valves 98 clearly 'valve' the '...input and output ports...between an open and closed position.' (claim 9). The reduced 'tubing size' shown in Figure 3A (claim 18) acts as a restrictor. With regard to claims 19 and 20, note the plurality of input and outport (Figure 3A). No patentable weight has been given to the recitation added to claim 1 by the amendment filed August 14, 2001, in the 'restrictions' shown in Figure 1 of Higdon et al would be sufficient to restrict the sample flow to '...about 50-70 cc/min at 15 psig'.

With respect to claim 9, the Examiner states: "With regard to claim 9 remarks, claim 9 includes recitation that an 'outside impulse (is required) to place said actuable ports in the open position.' This recitation appears to be contrary to '..this forces the pistons into an upward position, resulting in closed ports' remarks in the amendment and the recitation of claim 9 is clearly readable on the solenoid valve 98 operation.

With respect to claim 13, the Examiner stated that "*Higdon* discloses the claimed invention except for the recitation of a 'filter' as taught by *Upchurch* (Figure 1). It would have been obvious

to one having ordinary skill in the art at the time the invention was made to modify the chromatograph system of *Higdon et al* to include a 'cartridge filter' as taught by *Upchurch* in order to provide more 'pure' fluid to be tested and/or processed." OA of 11/5/01, p. 5. "Further in particular not the disclosure of a filter for the 'fluid streams' (column 6, lines 58+) of *Higdon et al.* Applicant's remarks, drawnt to filter dispostion, were considered, however, not deemed persuasive. In column 6, lines 58+ both outlet port filters and filters disposed in inlets are disclosed." *Id.*

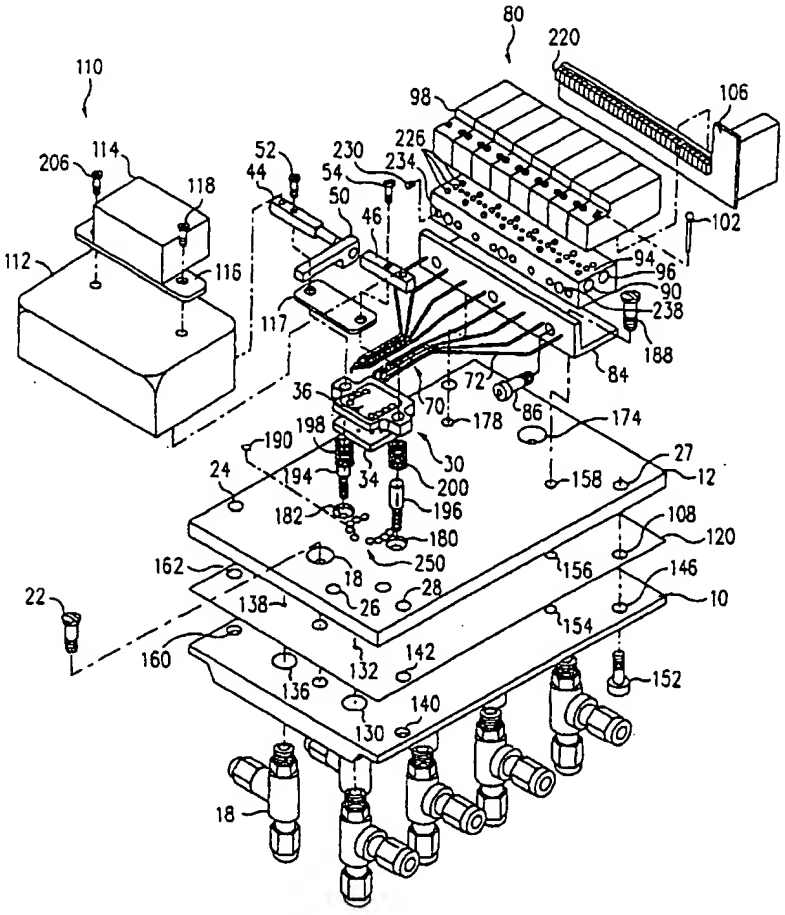

FIG. 2

U.S. Patent 6,102,068 (*Higdon*)

Higdon teaches a selector valve assembly using a micromachined valve body held in a releasable housing which in turn is mounted on a manifold plate to which are attached inlet and outlet fluid-carrying tubing. The micromachined valve body is connected to a pilot valve assembly